

REMARKS

In the last Office Action, the Examiner rejected claims 1-4 under 35 U.S.C. §103(a) as being unpatentable over European Patent No. 1,138,831 to Hanafusa et al. ("Hanafusa") in view of U.S. Patent No. 6,823,947 to Nagoaka et al. ("Nagoaka"). Additional art was cited of interest.

Applicants note that while the Office Action Summary indicates objection of claims 5-6, the Detailed Action does not specify the nature of the objection to claims 5-6. During a telephone conference on October 21, 2005, the Examiner advised that claims 5-6 have been objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form to incorporate the subject matter of base claim 1.

Applicants and applicants' counsel note with appreciation the indication of allowable subject matter concerning claims 5 and 6. However, for the reasons noted below, applicants respectfully submit that amended claims 1-4 and newly added claims 7-20 also patentably distinguish from the prior art of record.

In accordance with the present response, the specification has been suitably revised to correct informalities and bring it into better conformance with U.S. practice. Original independent claim 1 has been amended to

further patentably distinguish from the prior art of record. Allowable claim 5 has been rewritten in independent form to incorporate the subject matter of base claim 1. Original claims 1-6 have also been amended in formal respects to improve the wording and bring them into better conformance with U.S. practice. New claims 7-20 have been added to provide a fuller scope of coverage. A new abstract which more clearly reflects the invention to which the amended and new claims are directed has been substituted for the original abstract.

Applicants request reconsideration of their application in light of the foregoing amendments and the following discussion.

Brief Summary of Invention

The present invention is directed to a working machine, such as snow removing machines and cultivating machines.

Figs. 12-14 show conventional working machines in the form of snow removing machines. As described in the specification (pages 1-4), the conventional snow removing machines have a large number of component parts and are associated with a large size and weight as well as a relatively complicated shape and high rigidity. For example, due to their excessive length, the conventional snow removing

machines have poor turning capability. As a result, the traveling performance of the conventional snow removing machines has been ineffective in providing smooth snow removal operations with high efficiency.

The present invention overcomes the drawbacks of the conventional art. Figs. 1-7 show an embodiment of a working machine 10 according to the present invention embodied in the claims. The working machine 10 has a transmission case 50 having a transmission mechanism 130 accommodated therein. The transmission mechanism 130 has an input shaft 131 having a first longitudinal axis and an output shaft 132 having a second longitudinal axis extending in a direction generally perpendicular to the first longitudinal axis (Fig. 5). A working unit 70 is mounted to a front portion or a side portion of the transmission case 50 and is connected to the output shaft 132 of the transmission mechanism 130. A working drive source 61 is connected to the input shaft 131 of the transmission mechanism 50 for driving the working unit 70 via the transmission mechanism 130. The working drive source 61 is mounted to an upper surface portion of the transmission case 50. A traveling unit 30L, 30R has at least one driving axle 34L, 34R mounted to a side portion of the transmission case 50. An electric motor 20L, 20R is mounted to a side portion of the transmission case 50 for driving the traveling unit 30L, 30R.

By the foregoing construction, the size and weight, as well as the number of components, of the working machine 10 according to the present invention are substantially reduced as compared to the conventional art. As a result, the operability of the working machine is improved, including the turning capability of the working machine during a working operation.

Traversal of Prior Art Rejection

Claims 1-4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hanafusa in view of Nagoaka. Applicants respectfully traverse this rejection and submit that the combined teachings of Hanafusa and Nagoaka do not disclose or suggest the subject matter recited in amended claims 1-4.

Amended independent claim 1 is directed to a working machine and requires a transmission case having a transmission mechanism accommodated therein, the transmission mechanism having an input shaft having a first longitudinal axis and an output shaft having a second longitudinal axis extending in a direction generally perpendicular to the first longitudinal axis. Amended claim 1 further requires a working unit mounted to a front portion or a side portion of the transmission case and connected to the output shaft of the transmission mechanism, and a working drive source connected to the input

shaft of the transmission mechanism for driving the working unit via the transmission mechanism, the working drive source being mounted to an upper surface portion of the transmission case. Amended claim 1 further requires a traveling unit having at least one driving axle mounted to a side portion of the transmission case and an electric motor mounted to a side portion of the transmission case for driving the traveling unit. No corresponding structural combination is disclosed or suggested by the combined teachings of Hanafusa and Nagoaka.

Hanafusa discloses a snow plow having a working unit 13, a traveling unit 12, an engine 14 and an electric motor 21L, 21R (Fig. 1). As recognized by the Examiner, Hanafusa does not disclose or suggest a transmission mechanism having a vertically oriented input shaft for transmitting power from a working device to an output shaft. In Hanafusa, the transmission mechanism has a belt 103 (Fig. 4) for transmitting power from a working device (engine 14) to an output shaft 105 connected to the working unit 13.

Moreover, Hanafusa does not disclose or suggest the specific positional relationship between the input and output shafts of the transmission mechanism specified in claim 1. More specifically, Hanafusa does not disclose or suggest a transmission mechanism comprised of an input shaft having a first longitudinal axis and an output shaft having a second

longitudinal axis extending in a direction generally perpendicular to the first longitudinal axis. As described in the specification, the positional relationship between the input and output shafts of the transmission mechanism reduces the overall front-to-rear dimension of the transmission case and, therefore, the overall dimension of the working machine. As noted above, Hanafusa does not disclose or suggest a vertically oriented input shaft.

The Examiner cited the secondary reference to Nagoaka which discloses a working machine having a working unit connected to an output shaft 71 of a transmission mechanism driven by a working device 20. A vertically oriented input shaft 51 transmits power from the working device 20 to the output shaft 71. The Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission mechanism of Hanafusa by replacing the belt 103 with a vertically oriented input shaft, as disclosed by Nagoaka, in order to reduce the overall size of the working machine.

First, it is unclear how the Examiner proposes to modify the transmission mechanism of Hanafusa to incorporate a vertically oriented input shaft. In this regard, Hanafusa and Nagoaka disclose different types of working devices (i.e., engines). Hanafusa does not disclose a vertical working

device as disclosed by Nagoaka. Accordingly, one of ordinary skill in the art would not have been led to modify the teachings of Hanafusa in view of Nagoaka to arrive at the invention recited in independent claim 1, including a transmission mechanism having a vertically oriented input shaft.

Moreover, even if it were proper to modify Hanafusa in view of Nagoaka as suggested by the Examiner, the proposed combination would not lead to the present invention embodied in amended independent claim 1. More specifically, Nagoaka also fails to disclose or suggest a transmission mechanism comprised of an input shaft having a first longitudinal axis and an output shaft having a second longitudinal axis extending in a direction generally perpendicular to the first longitudinal axis. In Nagoaka, longitudinal axes of the transmission mechanism input and output shafts do not extend generally perpendicular to one another. As shown in Fig. 2 and described in columns 7, lines 10-15 of Nagoaka, the input shaft 51 and the output shaft 71 are disposed at an angle about 60° relative one another (i.e., the angle formed between the input and output shafts 61, 71 is not generally 90°).

Accordingly, since Nagoaka does not disclose or suggest the specific positional relationship between the input and output shafts of the transmission mechanism, Nagoaka does

not cure the deficiencies of Hanafusa. Accordingly, one of ordinary skill in the art would not have been led to modify the references to attain the claimed subject matter.

Claims 2-4 depend on and contain all of the limitations of amended independent claim 1 and, therefore, distinguish from the references at least in the same manner as amended independent claim 1.

In view of the foregoing, applicants respectfully submit that the rejection of claims 1-4 under 35 U.S.C. §103(a) as being unpatentable over Hanafusa in view of Nagoaka be withdrawn.

Applicants respectfully submit that the prior art of record also does not disclose or suggest the subject matter recited in newly added claims 7-20.

New claims 7-12 depend on and contain all of the limitations of amended independent claim 1, and, therefore, distinguish from the references at least in the same manner as claim 1.

Moreover, there are separate grounds for patentability of new claims 7-12. For example, claim 7 requires that the working unit, the working drive source and the transmission mechanism are vertically pivotable about a central axis of the driving axles of the traveling unit. Claim 10 is directed to the specific positional relationship

between the driving wheels/working drive source relative to the end portions of the crawler belts. Claim 12 is directed to the relative distances between central axes of the driving axles, the crankshaft, idle-wheel axis and motor shaft. No corresponding structural combinations are disclosed or suggested by the prior art of record.

New independent claim 13 defines the invention in a different manner and provides a different scope of coverage from amended independent claim 1. For example, while not limited to the specific positional relationship between the longitudinal axes of the input and output shafts of the transmission mechanism, as required by amended independent claim 1, claim 13 is directed to the pivotal feature of the working unit, the working drive source and the transmission mechanism about the central axis of the driving axles of the traveling unit. No corresponding structural combinations is disclosed or suggested by the prior art of record.

Claims 14-20 depend on and contain all of the limitations of independent claim 13 and, therefore, distinguish from the prior art of record at least in the same manner as claim 13.

In view of the foregoing amendments and discussion,
the application is believed to be in allowable form.
Accordingly, favorable reconsideration and allowance of the
claims are most respectfully requested.

Respectfully submitted,

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